UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/649,528	08/28/2000	Chowdary Ramesh Koripella	CT00-013	8469

23330 7590 02/17/2005

MOTOROLA, INC.
Corporate Law Department - #56-238
3102 North 56th Street
Phoenix, AZ 85018

EXAMINER	
LEUNG, JENNIFER A	

ART UNIT	PAPER NUMBER
1764	

DATE MAILED: 02/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/649,528	KORIPELLA ET AL.	
	Examiner	Art Unit	
	Jennifer A. Leung	1764	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 November 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,5-8,10,11,13-16,18,20 and 21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,5,7,8,10,11,13,15,16,18 and 20* is/are rejected.

7)☒ Claim(s) *6,14 and 21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 1, 2004 has been entered.

Response to Amendment

2. Applicant's amendment submitted on November 1, 2004 has been received and carefully considered. Claims 2, 4, 9, 12, 17 and 19 are cancelled. Claims 1, 3, 5-8, 10, 11, 13-16, 18, 20 and 21 remain active.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 3, 5, 7, 8, 10, 11, 13, 15, 16, 18 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Furuya et al. (JP 06-111838).

Independent claim 1 and corresponding dependent claims 3, 5, 7, 8 and 10

Regarding claims 1 and 10, Furuya et al. (see Figures, Abstract, and Machine Translation) discloses a hydrogen generator comprising:

a reaction zone including a reforming catalyst (i.e., plate **1**, containing reforming catalyst **6**; FIG.

1, 2; sections [0010]-[0014]);

a vaporization zone receiving liquid fuel and comprising at least one vapor channel for transporting a vapor from the vaporization zone to the reaction zone (i.e., plate **1** inherently comprises a vaporization zone and vapor channels as defined by flow paths **3**, as evidenced by the disclosed evaporation of the "poured" methanol and water within the fuel processor; see Example 1; sections [0060], [0062]);

an inlet channel for introducing liquid fuel into the vaporization zone (as shown in FIG. 7, via a fluid supply hole **27** to a plate **22** containing reforming catalyst in flow paths **23**, wherein plate **22** and plate **1** are the same element having different reference numerals; see sections [0034]-[0037]); and

an outlet channel for transporting hydrogen enriched gas out of the reaction zone (In FIG. 7, a corresponding discharge hole, not drawn, located in plate **22** downstream of hole **27** and flow paths **23**, wherein plate **22** and plate **1** are the same element having different reference numerals; see sections [0034]-[0037]);

wherein the inlet channel, the vaporization zone, the reaction zone, the at least one vapor channel, and the outlet channel all comprise a fuel processor and all are formed within an integral, sintered, monolithic ceramic carrier (best seen in FIG. 7; plates **1**, **2** comprise materials having high thermal conductivity, including sintered ceramic; FIG. 1, 2; sections [0017], [0030]-[0033]).

Regarding claims 3 and 7, Furuya et al. disclose an integrated heat source (i.e., comprising combustion plates **2**) thermally coupled to the reaction and vaporization zones (i.e., within plates **1**) using thermally conductive channels or thermally conductive vias (i.e., thermally

conductive passages **4**; FIG. 1, 2; sections [0010]-[0016]).

Regarding claim 5, Furuya et al. discloses the integrated heat source comprises a chemical heater including a catalyst and arranged to oxidize fuel (i.e., plates **2** including a combustion catalyst **5** coated on passages **4**; sections [0010]-[0016]).

Regarding claim 8, Furuya et al. disclose the vaporization and reaction zones comprise a plurality of parallel channels (i.e., passages **3** in plates **1**; FIG. 1, 2).

Independent claim 11 and corresponding dependent claims 13, 15 and 16

Regarding claims 11, 15 and 16, Furuya et al. (see Figures, Abstract, and JPO Machine Translation) disclose an apparatus comprising:

a three-dimensional integral, sintered, monolithic multi-layer ceramic carrier structure (i.e., plates **1**, **2** comprising materials having high thermal conductivity, including sintered ceramic; FIG. 1, 2; sections [0017], [0030]-[0033]), the carrier structure further defining a fuel processor (i.e., a reforming machine **42**, comprising plates **1** and **2**; FIG. 8, 15; sections [0040]-[0043]; [0074]-[0077]) having a reaction zone including a reforming catalyst (i.e., reforming catalyst **6** of plate **1**; FIG. 1, 2; sections [0010]-[0014]) and inherently comprising a vaporization zone, as evidenced by the disclosed evaporation of the "poured" methanol and water within the fuel processor (i.e., Example 1; sections [0060], [0062]);

the vaporization and the reaction zones comprising a plurality of parallel channels formed in the ceramic carrier for transporting a liquid fuel to the vaporization zone and a vapor in the reaction zone (i.e., passages **3** in plates **1**; FIG. 1, 2; Example 1);

the ceramic carrier further comprising an integrated heater (i.e., combustion plates **2**) thermally

coupled to the reaction and vaporization zones using thermally conductive channels or thermally conductive vias (i.e., thermally conductive passages **4**; FIG. 1, 2; sections [0010]-[0016]);

an inlet channel for introducing liquid fuel into the fuel processor (as shown in FIG. 7, via a fluid supply hole **27** to a plate **22** containing reforming catalyst in flow paths **23**, wherein plate **22** and plate **1** are the same element having different reference numerals; see sections [0034]-[0037]); and

an outlet channel for transporting hydrogen enriched gas out of the fuel processor (In FIG. 7, a corresponding discharge hole, not drawn, located in plate **22** downstream of hole **27** and flow paths **23**, wherein plate **22** and plate **1** are the same element having different reference numerals; see sections [0034]-[0037]);

wherein the vaporization zone, reaction zone, inlet channel and outlet channel are each formed within the integral, sintered, monolithic ceramic carrier (best seen in FIG. 7).

Regarding claims 13, Furuya et al. discloses the integrated heater comprises a chemical heater including a catalyst and arranged to oxidize fuel (i.e., plates **2** including a combustion catalyst **5** coated on passages **4**; sections [0010]-[0016]).

Independent claim 18 and corresponding dependent claim 20

Regarding claim 18, Furuya et al. (see Figures, Abstract, and JPO Machine Translation) disclose an apparatus comprising:

a three-dimensional integral, sintered, monolithic multi-layer ceramic carrier structure (i.e., plates **1**, **2** comprising materials having high thermal conductivity, including sintered ceramic; FIG. 1, 2; sections [0017], [0030]-[0033]), the carrier structure further defining

a fuel processor (i.e., a reforming machine **42**, comprising plates **1** and **2**; FIG. 8, 15; sections [0040]-[0043]; [0074]-[0077]) having a reaction zone including a reforming catalyst (i.e., reforming catalyst **6** of plate **1**; FIG. 1, 2; sections [0010]-[0014]) and inherently comprising a vaporization zone, as evidenced by the disclosed evaporation of "poured" methanol within the fuel processor (i.e., Example 1; sections [0060]);

the vaporization and the reaction zones comprising a plurality of parallel channels formed in the ceramic carrier for transporting a liquid fuel to the vaporization zone and a vapor in the reaction zone (i.e., passages **3** in plates **1**; FIG. 1, 2; Example 1);

the ceramic carrier further comprising an integrated heater (i.e., combustion plates **2**; FIG. 1, 2) thermally coupled to the reaction and vaporization zones (i.e., reforming plates **1**; FIG. 1, 2) using thermally conductive structures (i.e., the walls defining combustion passages **4**);

an inlet channel for introducing the liquid fuel into the fuel processor (as shown in FIG. 7, via a fluid supply hole **27** to a plate **22** containing reforming catalyst in flow paths **23**, wherein plate **22** and plate **1** are the same element having different reference numerals; see sections [0034]-[0037]); and

an outlet channel for transporting hydrogen out of the fuel processor (In FIG. 7, a corresponding discharge hole, not drawn, located in plate **22** downstream of hole **27** and flow paths **23**, wherein plate **22** and plate **1** are the same element having different reference numerals; see sections [0034]-[0037]);

wherein the vaporization zone, the reaction zone, the plurality of parallel channels, the inlet channel and the outlet channel are each formed within the integral, sintered, monolithic ceramic carrier (best seen in FIG. 7).

Regarding claim 20, Furuya et al. discloses the integrated heater comprises a chemical heater including a catalyst and arranged to oxidize fuel (i.e., plates **2** including a combustion catalyst **5** coated on passages **4**; sections [0010]-[0016]).

Instant claims 1, 3, 5, 7, 8, 10, 11, 13, 15, 16, 18 and 20 structurally read on the apparatus of Furuya et al.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 4, 9 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furuya et al. (JP 06-111838) in view of Ghosh et al. (US 5,961,932).

Regarding claim 4, Furuya et al. further discloses the fuel processor (i.e., reforming machine **42** comprising reforming and combustion plates **1**, **2**, respectively) being integrally laminated with a fuel cell stack, wherein electricity generated by the stack may be used as, "a power source at the time of starting in a case of supplying hydrogen to a fuel-cell-fuel pole through a hydrogen ion conductive film from passage of a reforming machine," section [0056]. In such a configuration, the electricity from the fuel cell stack heats the fuel processor because the, "reforming machine has electric conductivity," section [0056]. Although Furuya et al. does not specifically state, "a resistive heater that is electrically driven," the above configuration is substantially such. Furthermore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an electrically driven resistive heater for the integrated heat source in the apparatus of Furuya et al., since the use of resistive heaters for supplying heat to a reaction is well known in the art, and the substitution of known equivalent structures

involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958). Ghosh et al. evidences the conventionality of using a resistive heating element for heating a reaction zone by teaching a reaction chamber **34** being heated by an embedded heating element **38** driven by electrical leads **40** (column 5, lines 19-28; FIG. 3).

Regarding claims 9 and 17, although Furuya et al. are silent as to the vaporization and reaction zones comprising at least one serpentine channel, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate shape for the plurality of parallel channels (passages **3**; FIG. 1, 2) in the apparatus of Furuya et al., on the basis of suitability for the intended use, since changes in shape merely involves ordinary skill in the art. Furthermore, Ghosh et al. evidences the conventionality of providing channels of serpentine shape by teaching that, "It is instructive to note that a plurality of channels can be provided to handle more than two chemicals or alternatively the reaction chamber **34** can be made longer by configuring serpentine, complex, wavy, winding and angular meandering forms to allow for longer reaction time," (column 5, lines 15-19).

Allowable Subject Matter

5. Claims 6, 14 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

6. Applicant's arguments filed on November 1, 2004 have been fully considered but they are not persuasive. Beginning on page 11, second paragraph, Applicants argue,

> "The cited Furuya patent reference describes a separate component to feed the "reforming machine" (see Figure 9 and 15, piping **46** and heater **47**, for their "inherently comprising a vaporization zone"). In Example 1, fluid passages **3** and **4** are not initially at 200 C at start-up; therefore, no vaporization can take place in the "reforming machine". To accomplish the combustion process, elements **46** and **47** were described in the text for Figure 9 and 15, and this is a discrete component. Additionally, "poured" as mentioned by the Examiner, is a translation interpretation of the original Japanese, and probably should be translated as "flowed". In paragraph [034], line 23, fluid appears to be defined as "hydrogen gas", and therefore could be interpreted as "gas" throughout, since "liquid", "liquid methanol", or "liquid methanol/water" was not ever used. "Fuel Supply" in [040] for the description of figure 8 description can again be interpreted as "gas fuel supply" and not liquid because of the "temperature change" of the "shape memory alloy".

Beginning on page 12, fourth paragraph, Applicants further argue,

> "Furuya et al. teaches a discrete vaporizer, which lacks the advantages of a completely integral, sintered, monolithic ceramic fuel processor as claimed by the present invention and described above in detail."

The Examiner respectfully disagrees and maintains that the vaporization zone of Furuya is not discrete but disclosed as being formed within the integral, sintered, monolithic ceramic carrier. Sections [0060] and [0062] (emphasis added in italics) are cited in support of this assertion.

The Machine-Assisted Translation (Thomson ™ version) of section [0060] reads,

> "To the fluid flow path **4** which has a combustion catalyst on the surface of a slot, since the temperature in the fluid flow path **4** went up methanol and air to about 200 degrees C when composite fuel was poured, it *poured* the fuel which mixed methanol and water in the fluid flow path **3** 1:1. *As a result, methanol and water vaporized* and hydrogen was converted further."

The Machine-Assisted Translation (Thomson ™ version) of section [0062] reads,

> "When the composite fuel of methanol and air was poured to the fluid flow path **4** which has a combustion catalyst on the surface of a slot, and the fuel of one 5 times the volume of this was poured as compared with the case of Example 1, the temperature of the fluid flow path **4** went up to it at about 200 degrees C. *Next*, it *poured* the fuel which mixed methanol and water in the fluid flow path **3** 1:1. *As a result, methanol and water vaporized* and it converted into hydrogen further."

As illustrated by these two sections, one having ordinary skill in the art at the time the invention was made would have properly interpreted the term "poured" to mean the supply of methanol and water to the fluid flow paths **3** of the reforming layers **1** as a liquid, because the methanol and water must first be supplied to flow paths **3** as a liquid in order to allow for the disclosed vaporization of the methanol and water within flow paths **3** to form hydrogen. Applicants are correct in asserting that fluid passages **3** and **4** are *not initially* at 200 °C at start-up. However, as shown in the two cited sections, a supply of methanol and air is fed to the fluid flow paths **4** containing combustion catalyst **5** prior to the point in which any methanol and water is fed to the fluid flow paths **3** containing reforming catalyst **6**. It is only after the temperature within the fluid flow paths **4** has reached a predetermined temperature (e.g., 200 °C) that the supply of methanol and water to the fluid flow paths **3** is initiated. Thus, methanol and water are vaporized in the reforming flow paths **3**, due to the transfer of heat from the adjacent, pre-heated, combustion flow paths **4**.

Because the methanol and water are disclosed as being vaporized within the fluid flow paths **3**, one having ordinary skill in the art at the time the invention was made would not have interpreted the separate piping **46** and heater **47** as shown in FIG. 9 and 15 as "inherently comprising a vaporization zone", as argued by Applicants. It appears that the heater **47** is merely

used to initiate the opening and closing of the memory alloy piping **46** for adjustment of a fuel supply, based on a signal detected from a pressure sensor **48** (see section [0074]).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer A. Leung
February 15, 2005 JAL

Hien Tran

HIEN TRAN
PRIMARY EXAMINER